Green Prefab: Civil Engineering Hub in Microsoft Windows Azure

MICROSOFT CLOUD FUTURES 2012 May 7, 2012, Berkeley, USA

Furio Barzon
co-founder & CEO

Emerging market in the World

greenprefab

Radziner
California USA

Snøhetta
Norway

Gehry
Germany

Concko Gautier
Holland

Resolution4A
USA

Romero
USA

Fiberline
Switzerland

CENED
Certificazione ENergetica degli EDifici

Bioarchitettura®

ICMQ

CERTIFIED

TÜV SÜD

BUREAU VERITAS

green buildings

GREEN BUILDING COUNCIL ITALIA

ICIM

Case Legno Trentino

Ikea
Sweden

Oppenheim
Florida USA

Osaka Gas
Japan

Fisher
UAE

Cis
England

Toyota
Japan

Lot-ek
California USA

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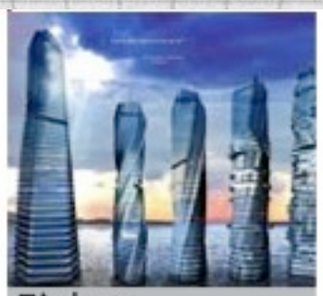
Switzerland

- World market of the Green Buildings:
  $ 406,000,000,000 in 2015
- Annual growth rate: **5.24%**

Ikea
Sweden

Oppenheim
Florida USA

Osaka Gas
Japan



Fisher
UAE

Cis
England

Toyota
Japan

Lot-ek
California USA

Green Prefab solution

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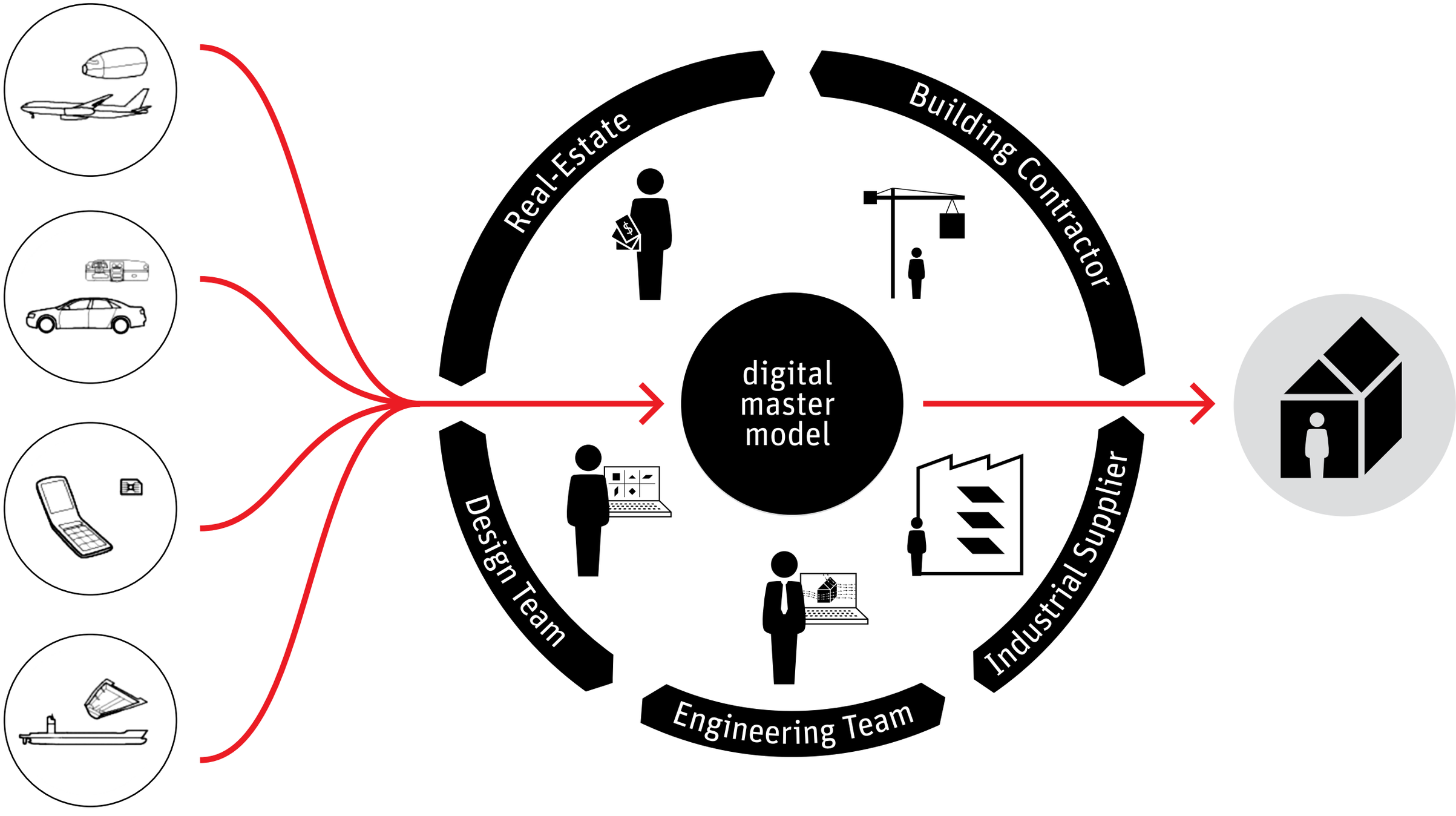
PREFABRICATION * DIGITAL MASTER MODEL * LIFE-CYCLE MANAGEMENT



technology transfer

stakeholders sharing master model compliant to prefabrication production

green building

Prototype up-and-running

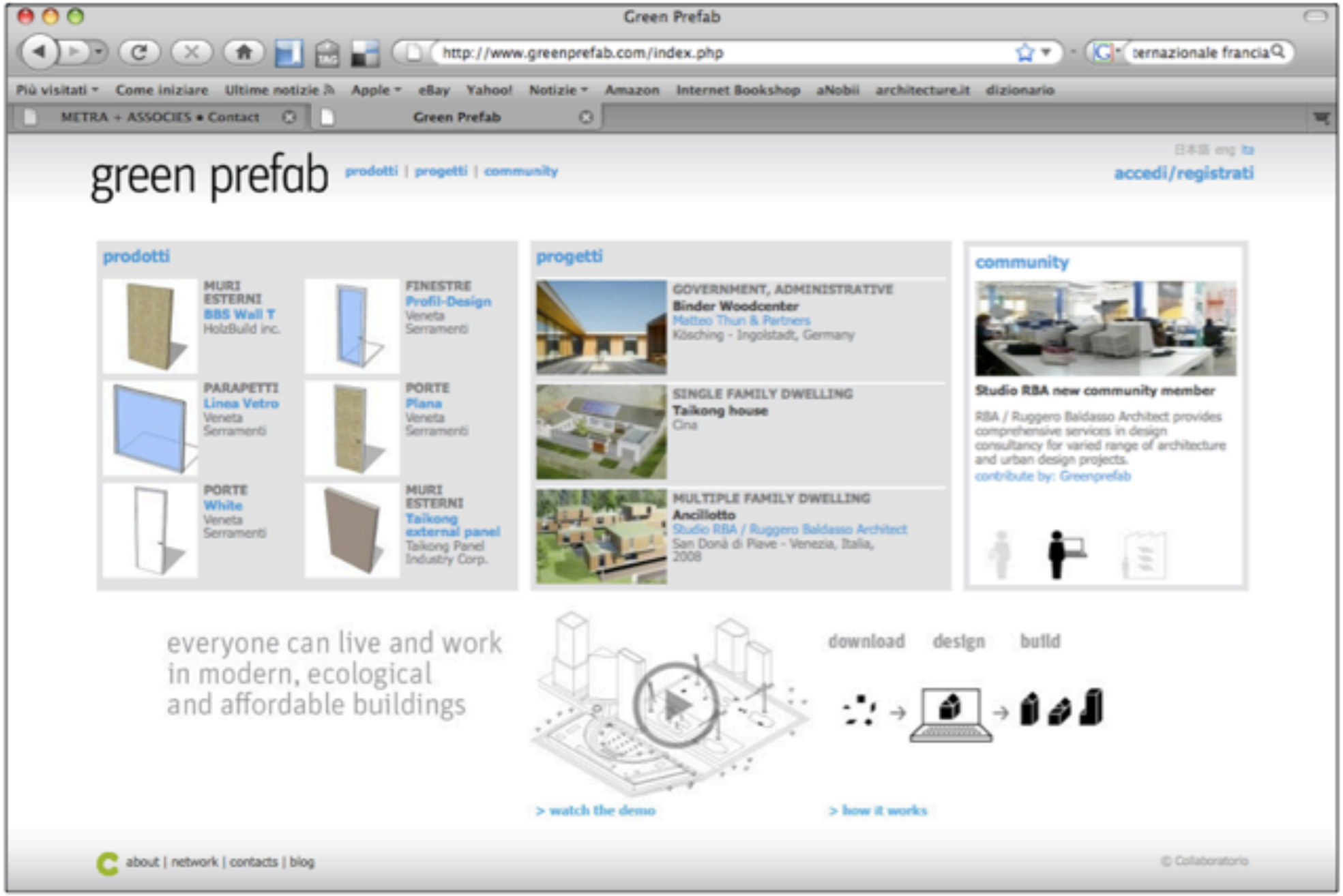
greenprefab

system conception

green prefab

demo

www.greenprefab.com



GPF current version available: demo version

1. Prefabrication

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Standard and non-standard elements
production of elements and macro-components

2. Digital Master Model

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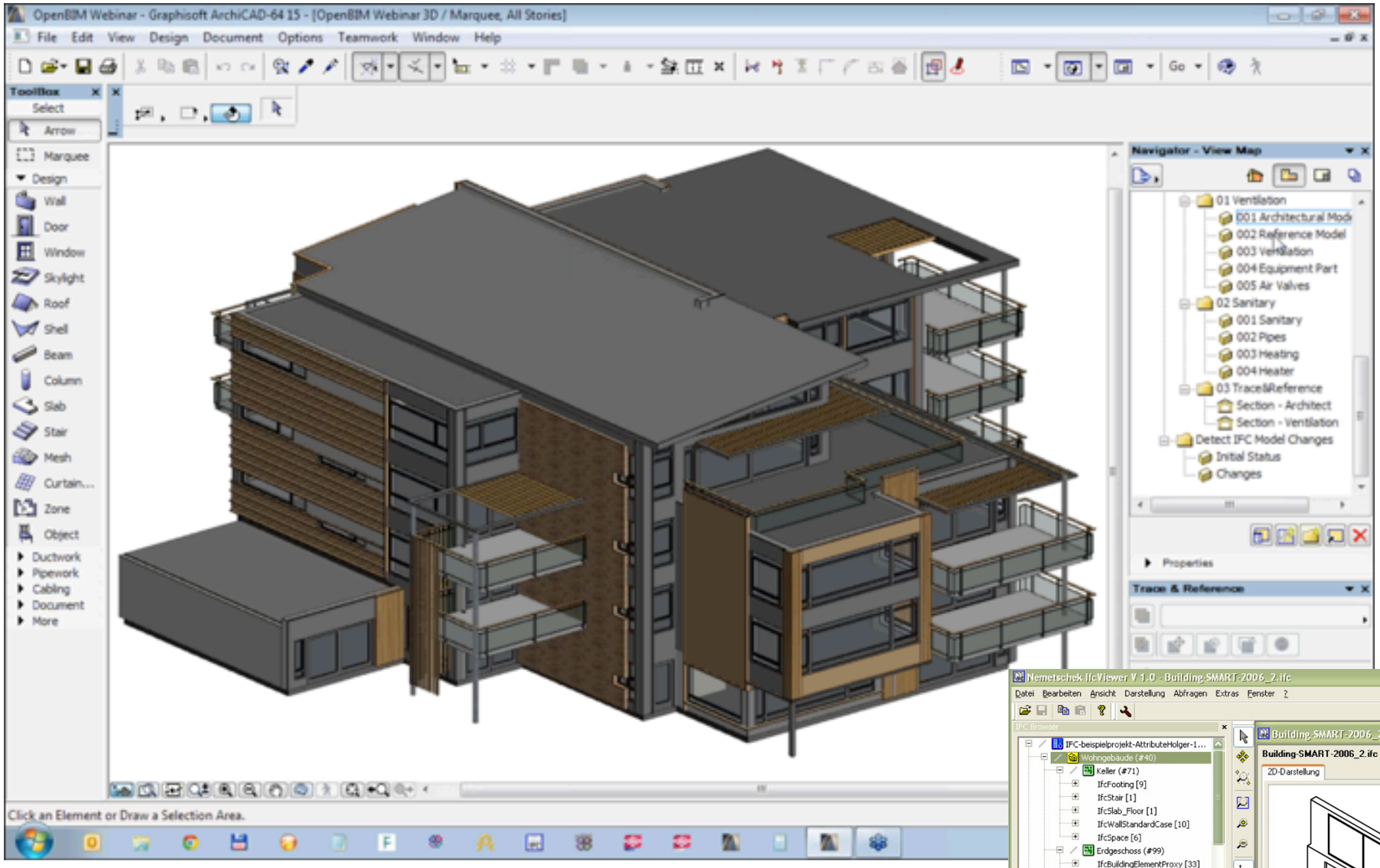

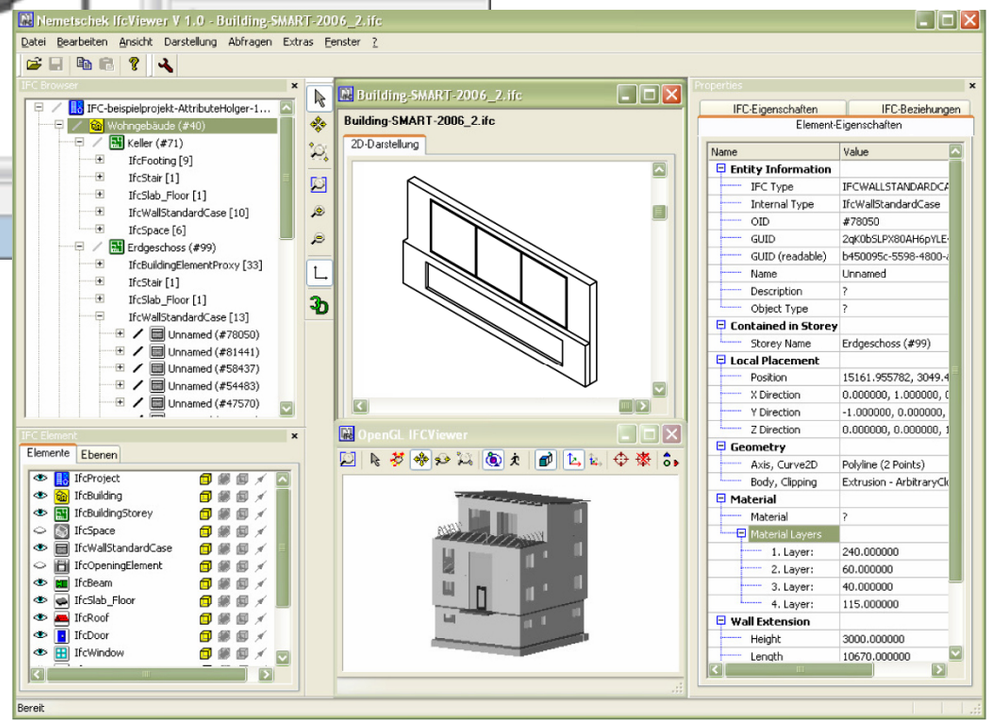

OPENBIM interoperable ontology and dataset (IFC)

Database of 3D prefabricated components with specific domain metadata

3. Product Life-Cycle Management

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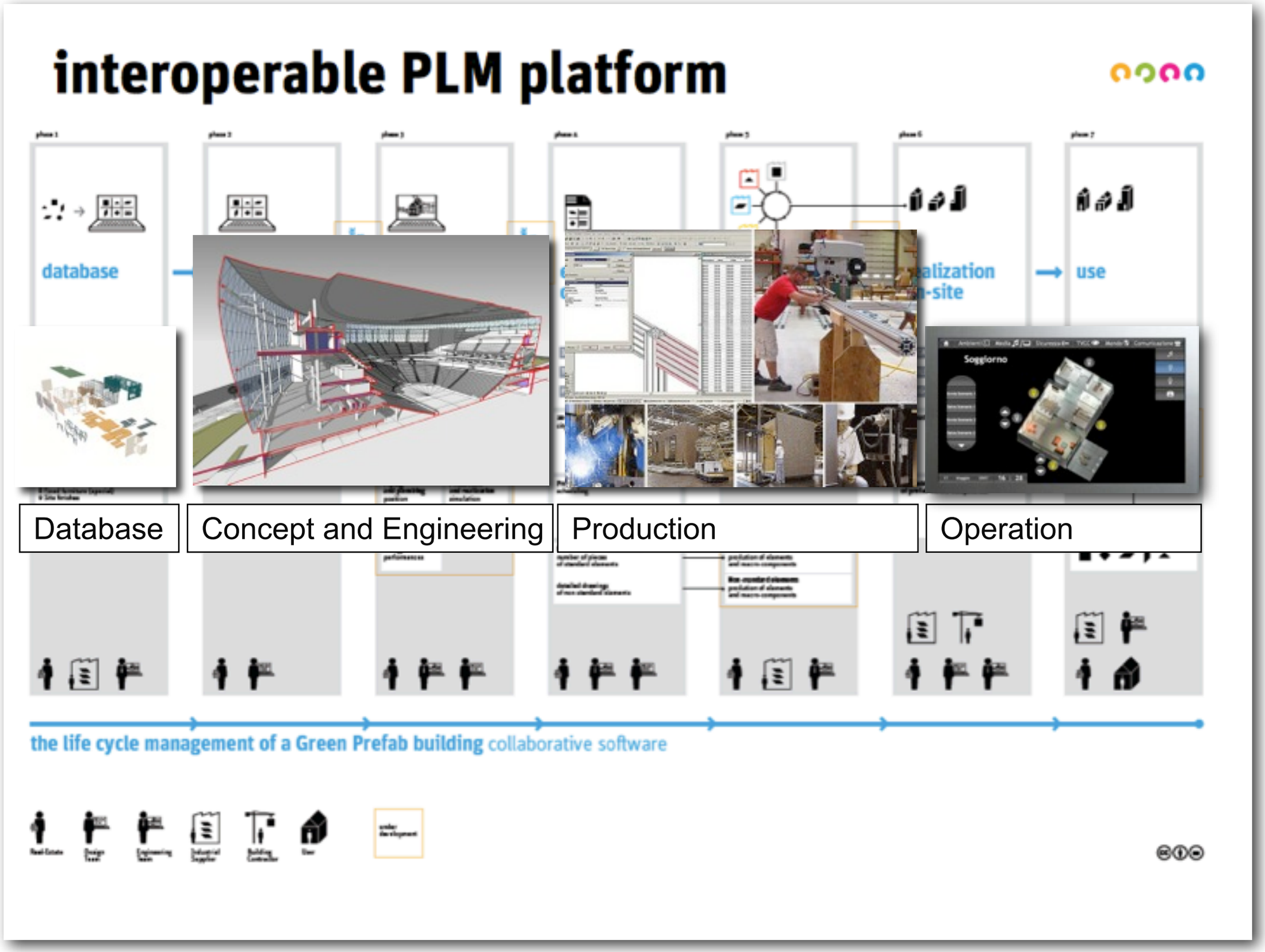

Engineering in the cloud

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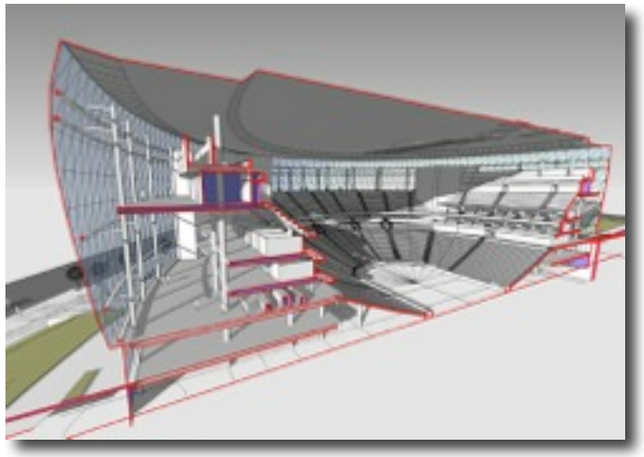
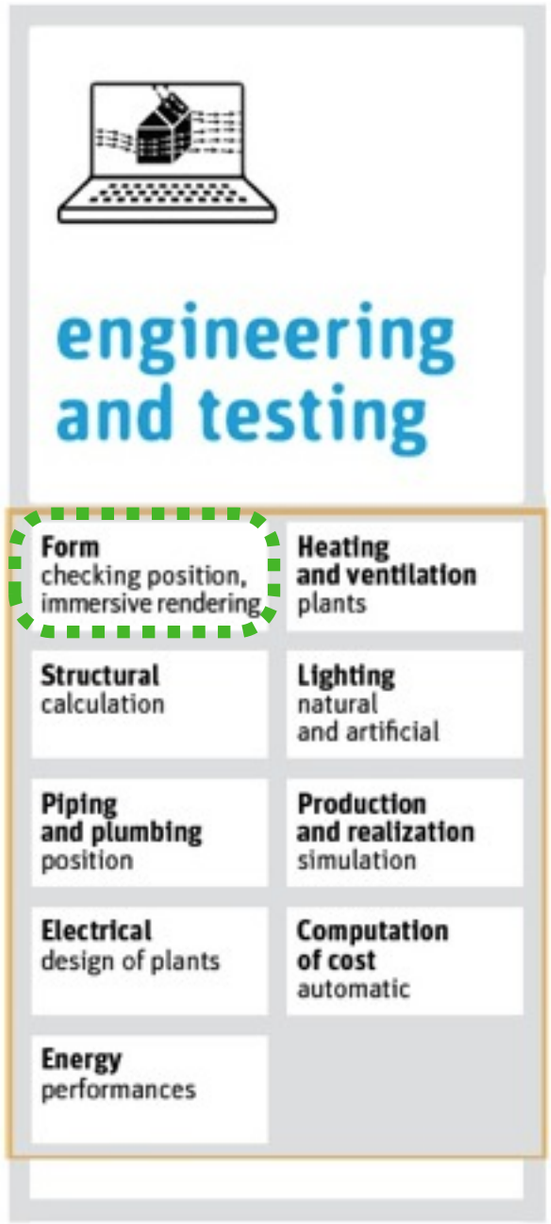


Concept and Engineering



Porting into the cloud of 3D rendering visualisation apps

Venus-C

Community approach

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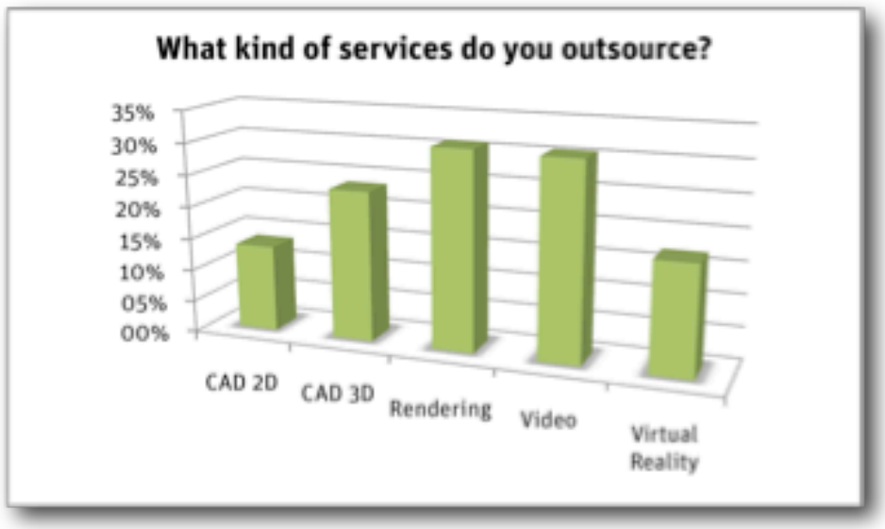
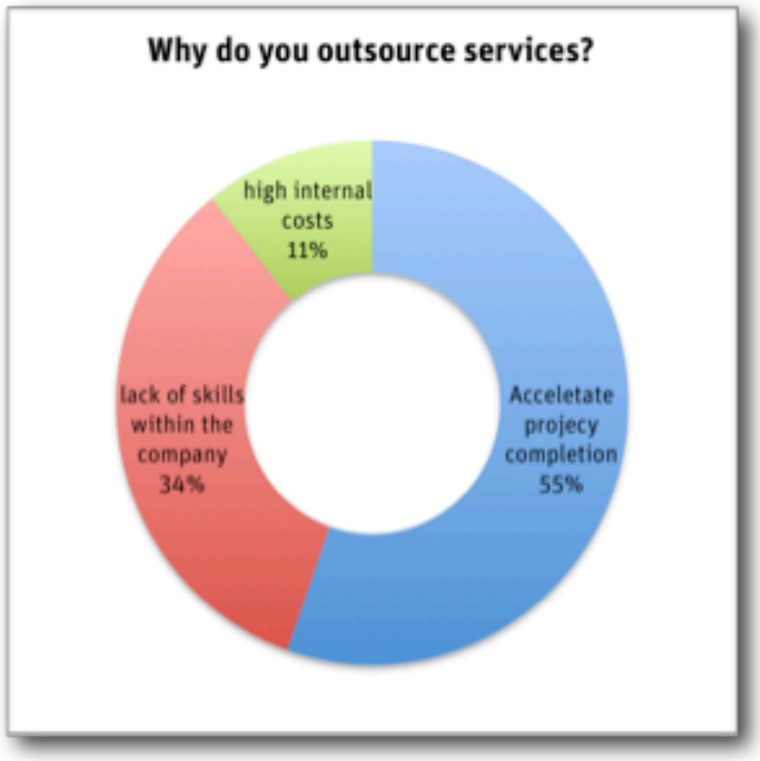
428 professionals among **20,000 users of the greenprefab** community answered a survey



More of the 60% of the interviewees outsource services for rendering and video



Companies outsource:
– to accelerate project completion 55%
– for a lack of skill within the company 34%

RESULTS:

A. **Architects widely design in 3D (80%)**
B. **3D rendering services are outsourced in the most case**
C. **Outsourcing is requested to speed up time of delivery**

Rendering Engine

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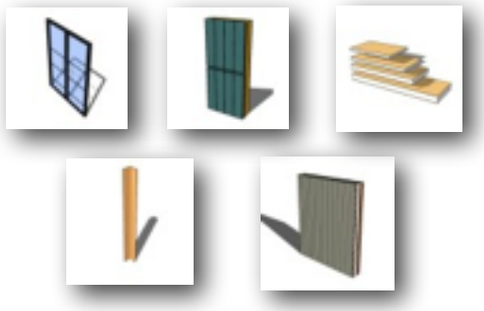
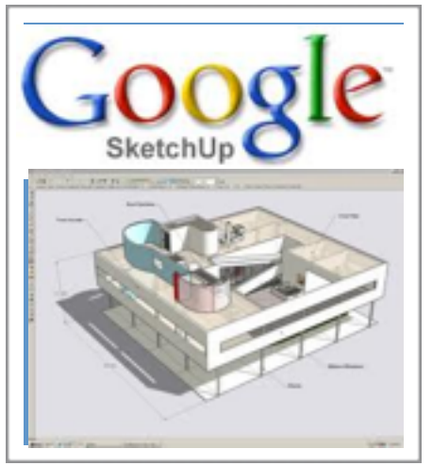


import



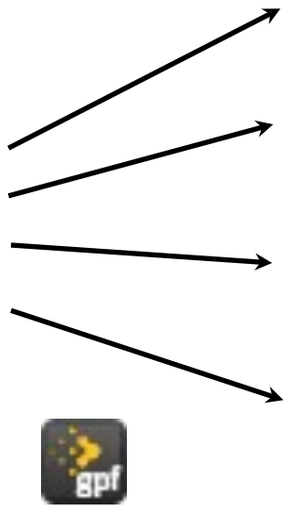
3D building components

Definition of building project SketchUp CAD

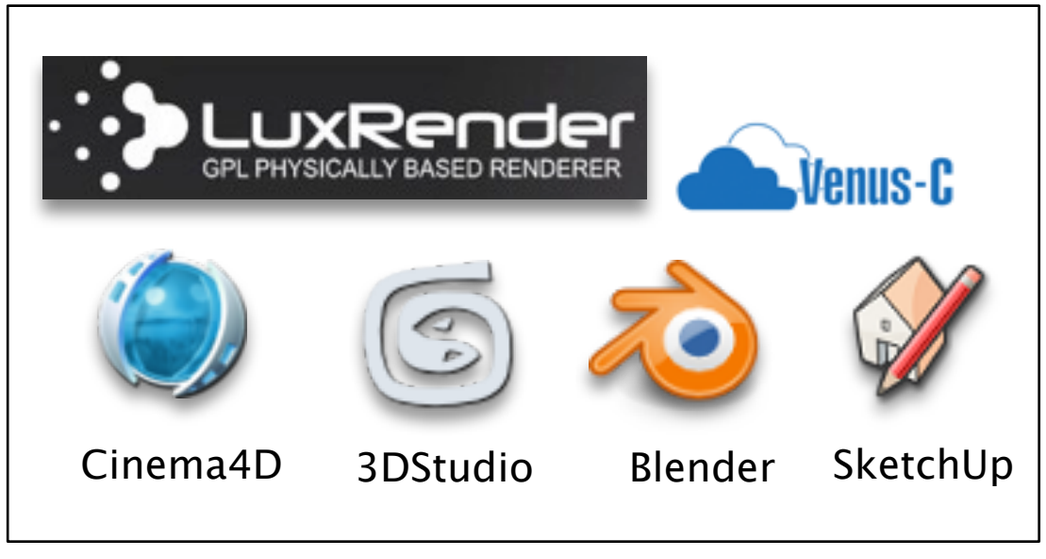
cloud rendered image

download

upload



dedicated SketchUp plug-in



LuxRender: an open source rendering engine based on Ray Tracing algorithm for image synthesis.

Integration in GPF platform

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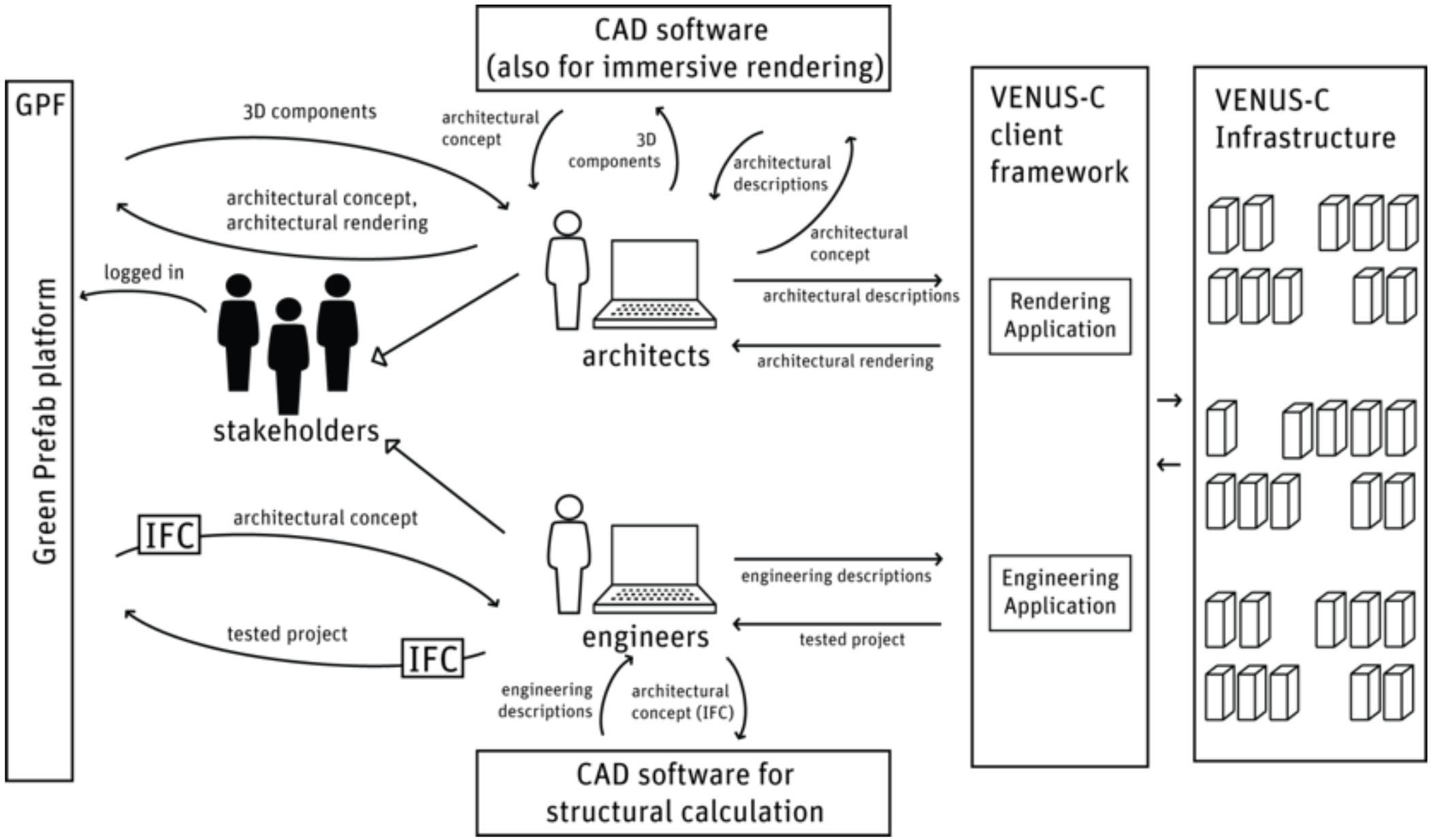
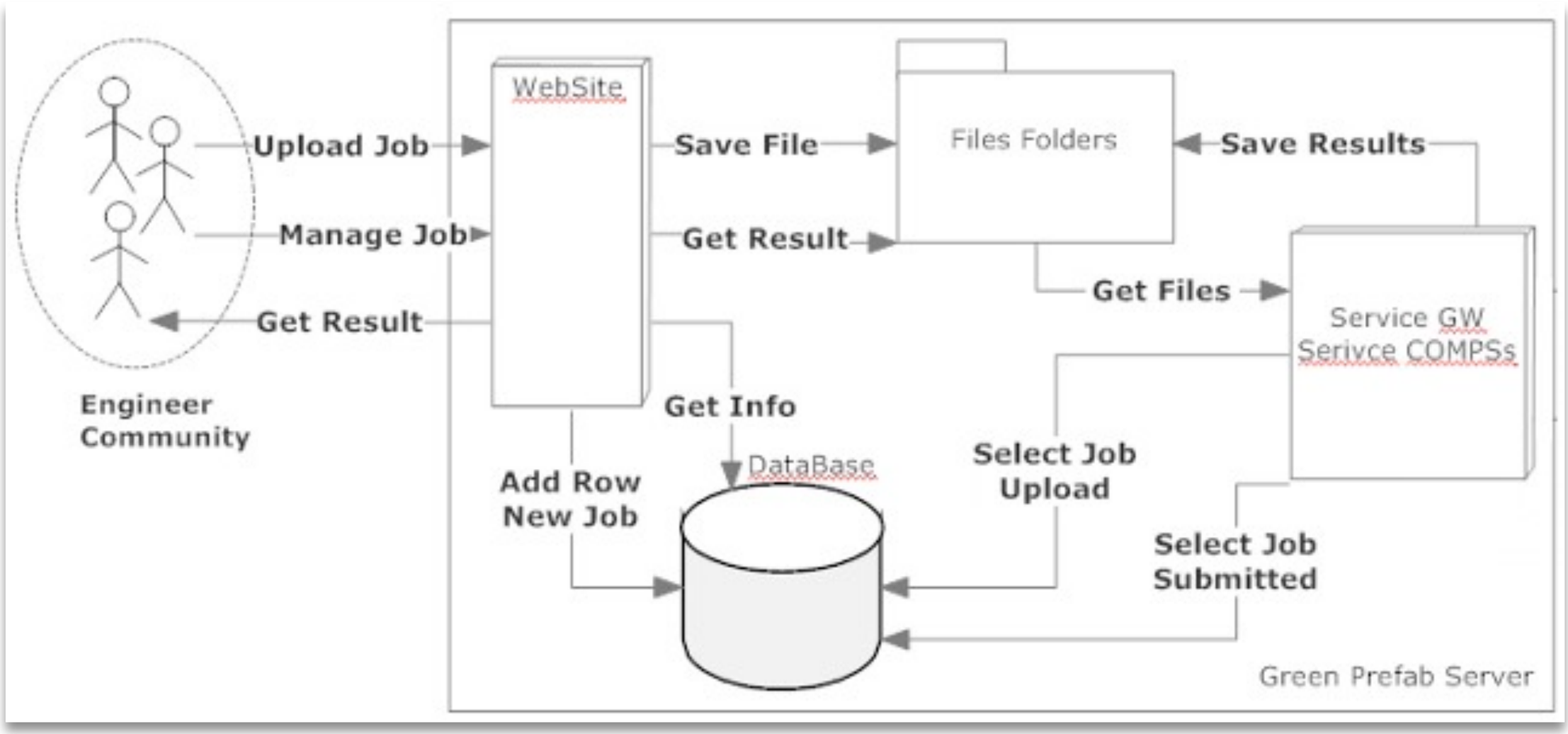


GPF community and VENUS-C cloud resources

HUB-E system architecture

greenprefab



Basic system architecture

HUB-E system architecture

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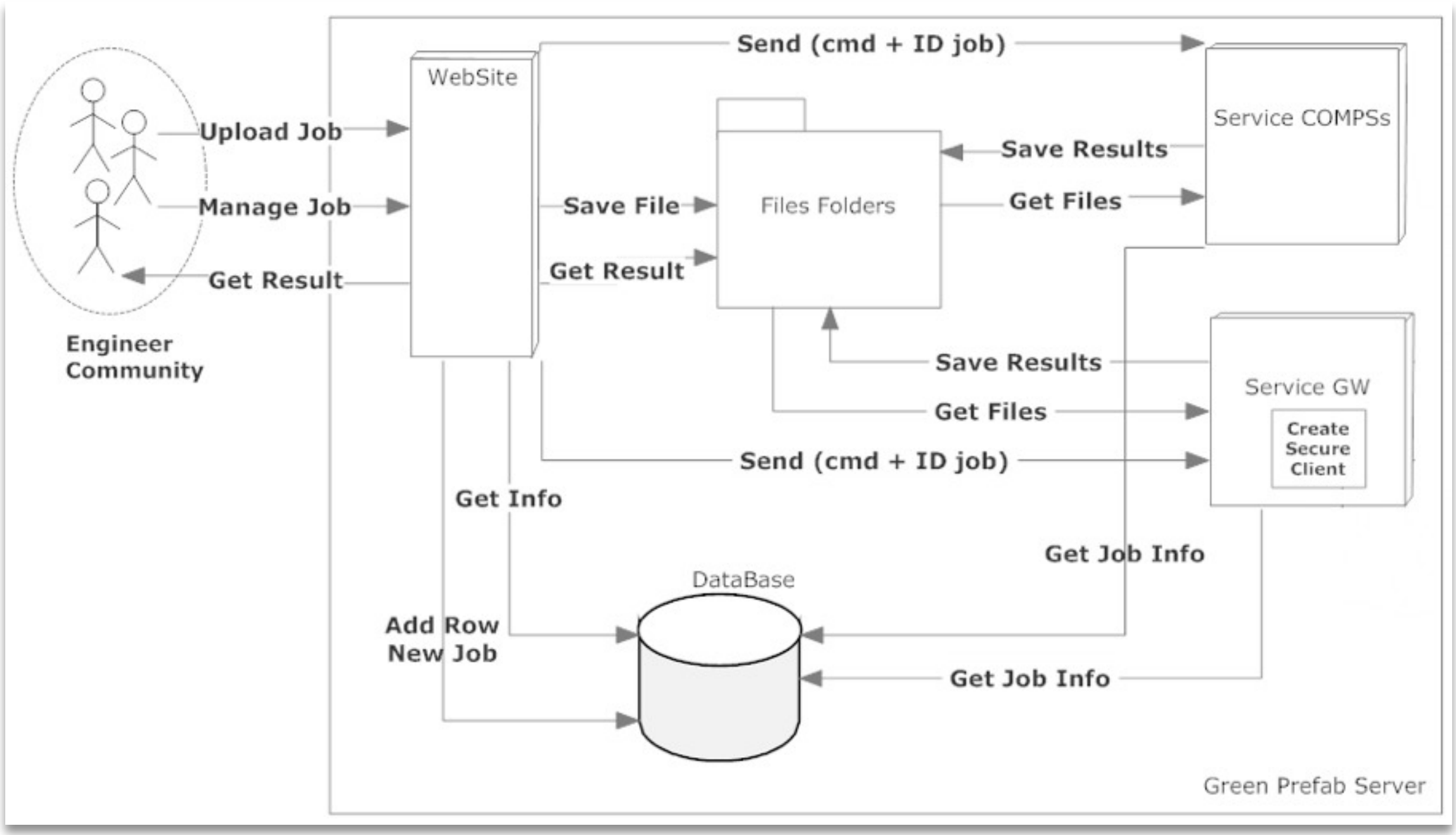

Multi-services system architecture

HUB-E system architecture

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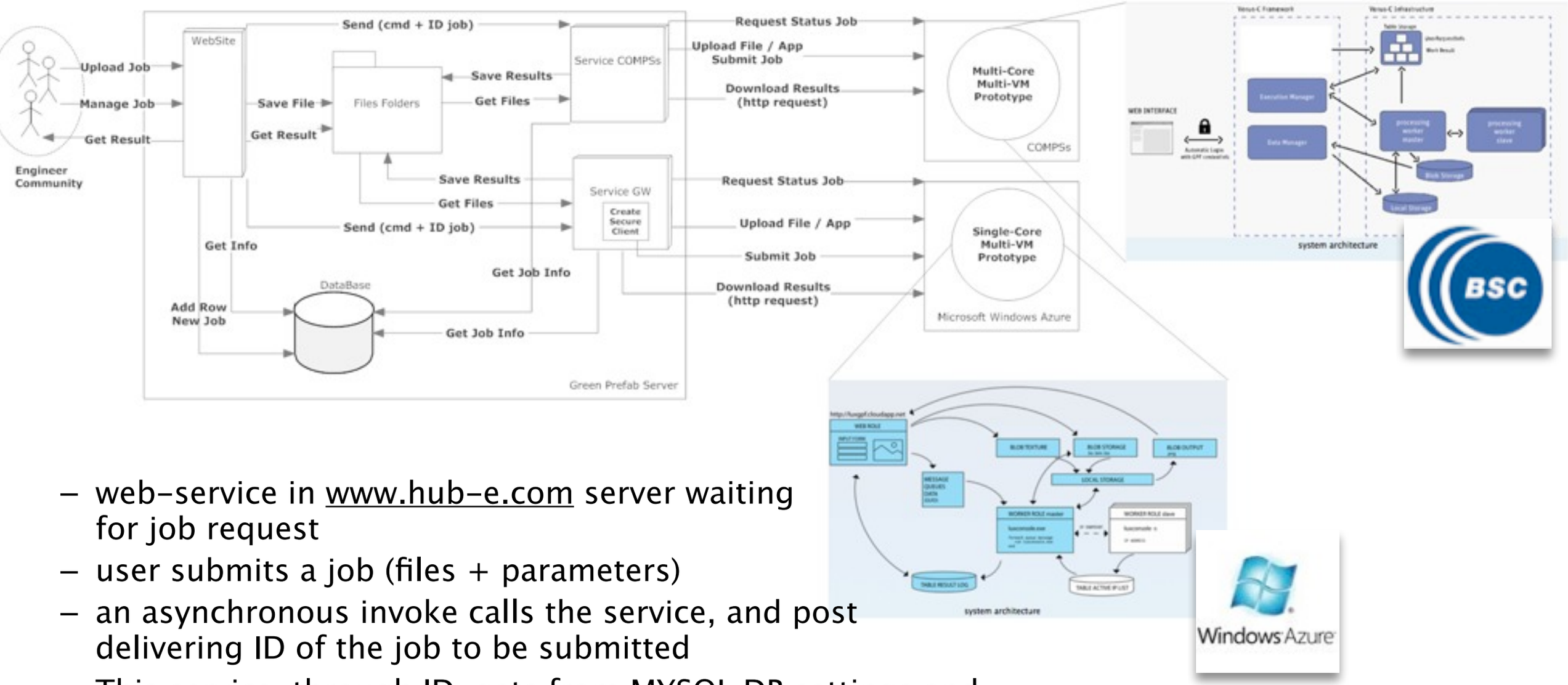
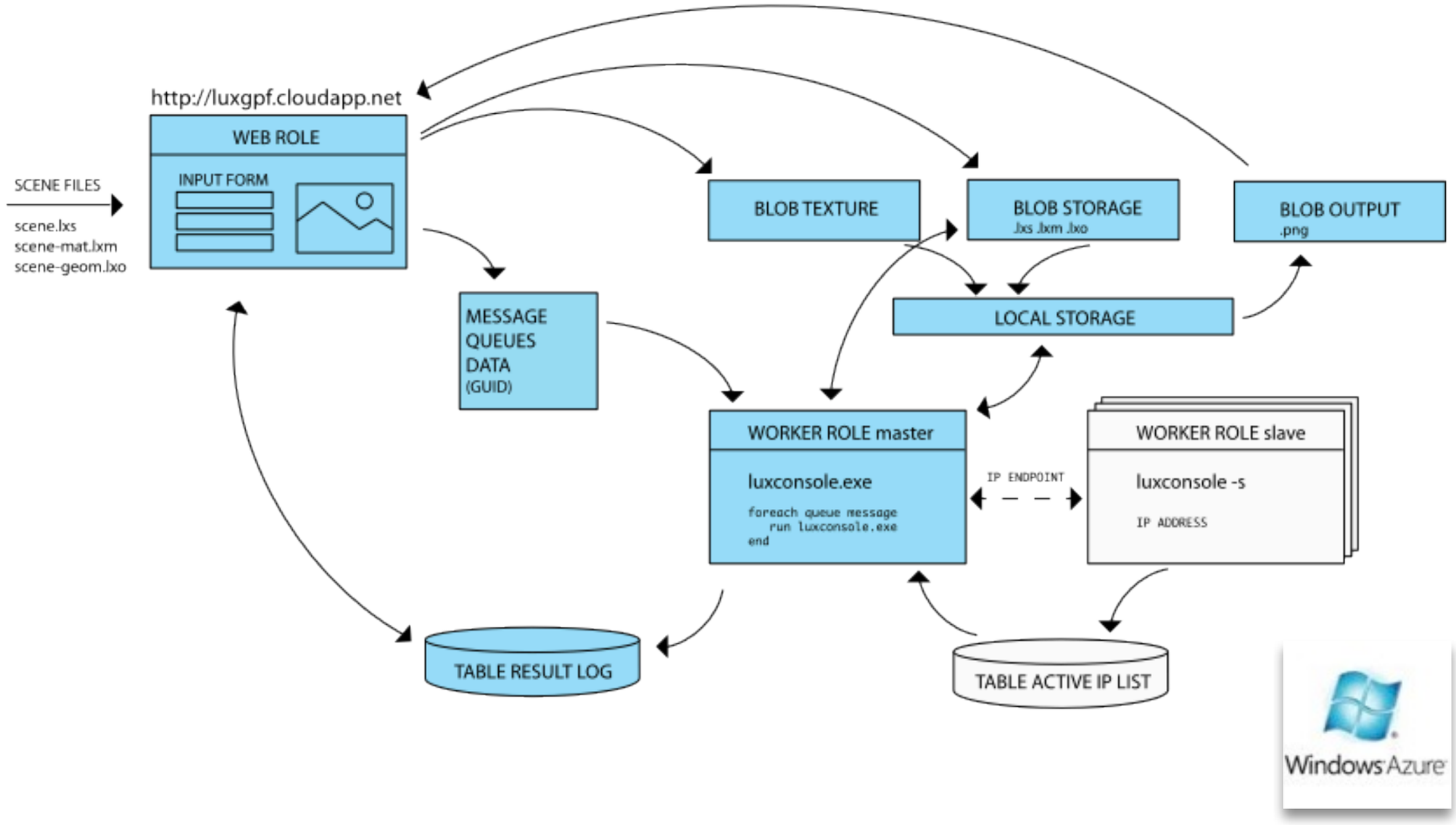
Complete system architecture



- web-service in www.hub-e.com server waiting for job request
- user submits a job (files + parameters)
- an asynchronous invoke calls the service, and post delivering ID of the job to be submitted
- This service, through ID, gets from MYSQL DB settings and from storage the files needed to submit data on Windows Azure
- During the execution of the service, the service itself updates data in HUB-e DB for user feedback
- Same service waits for the jobs completion to get result (=.png picture)

HUB-E system architecture

greenprefab



MS Windows Azure architecture

Business model rendering

greenprefab

Subscription: **free**

Windows Azure™

BSC Barcelona Supercomputing Center
Centro Nacional de Supercomputación

OpenNebula

EMOTIVE CLOUD BARCELONA

HIGH QUALITY PICTURE
usage: **$ WINDOWS AZURE**
total cores: 32

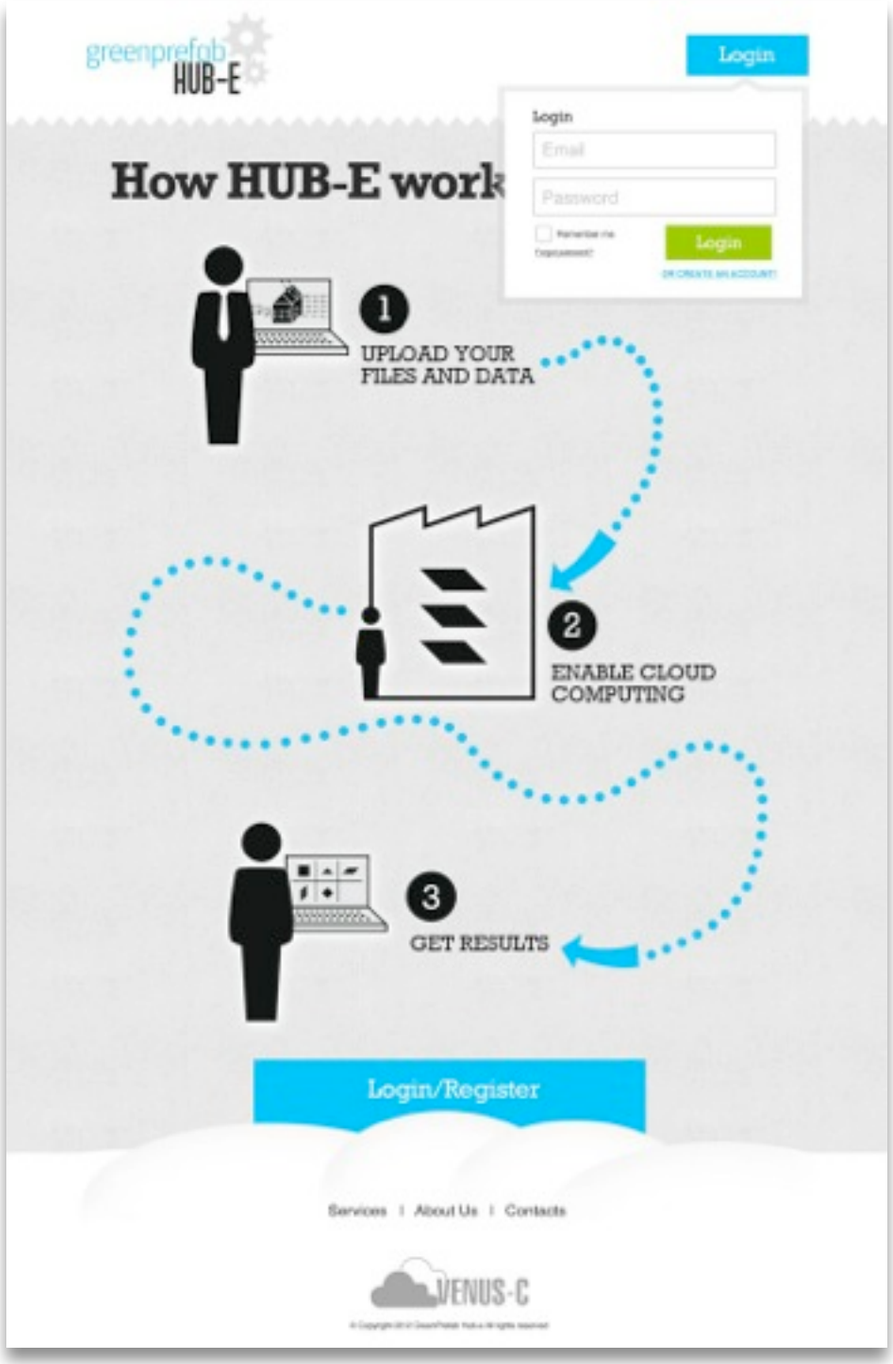
- best for enterprise solutions
- better VM control
- flexibility

LOW QUALITY PICTURE
usage: **free BSC**
total cores: 80

- best for research purposes
- resource provider scalability
- easier to implement

www.hub-e.com

greenprefab



Video or live demo >

Quantitative validation sample

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- Input: (lxs+lxm+lxo) 10 MB + (zip) 0.3 MB
- Output volume (png): 1.6 MB
- Total Time: 14m 17s
- Render size: 1024 x 768 pixels
- Computational size: 8 core 4 vm
- Quality: High
- Cost: 0.42 € (0.42 € for computing, 0 € for storage and 0 € for transfers)

AVERAGE JOB
< € 1,00
< 10 minutes

Current development

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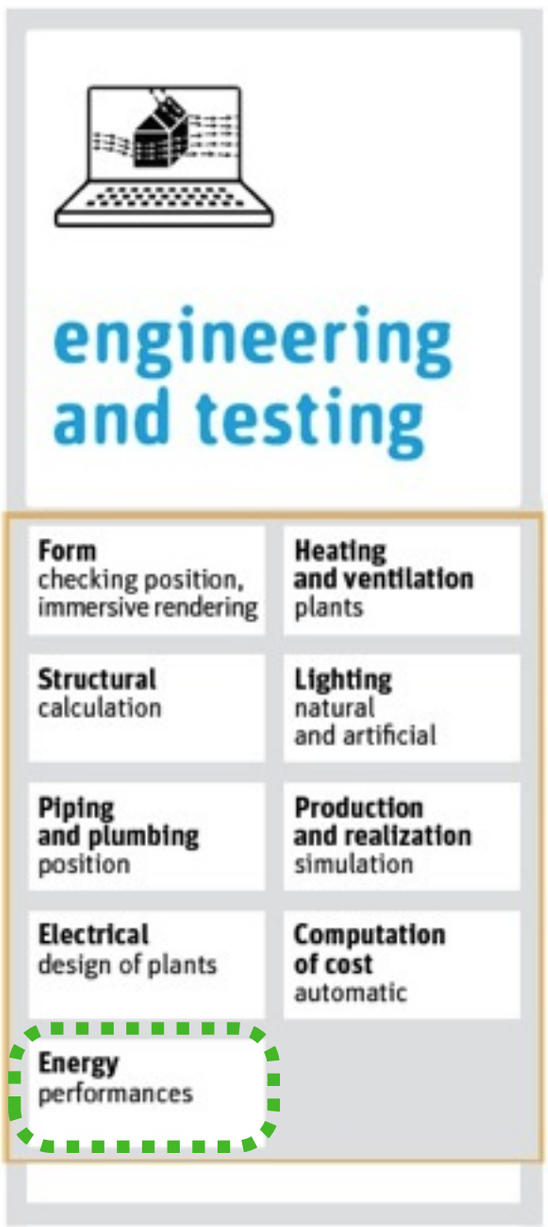
Green Prefab GPF developed www.hub-e.com, a prototype website to deliver cloud computing services for civil engineering integrated in the GPF system workflow.

The focus during the EU research period VENUS-C has been to explore a prototype integration of rendering visualisation.

Now the system is incorporating new tools.

Next: Eco-efficiency analysis



- **Pilot AOLSBD Online Assisted Sustainable Building Design**
  - training and technical support for porting in COMPSs
  - integration in GPF PLM system
  - connection to GPF community

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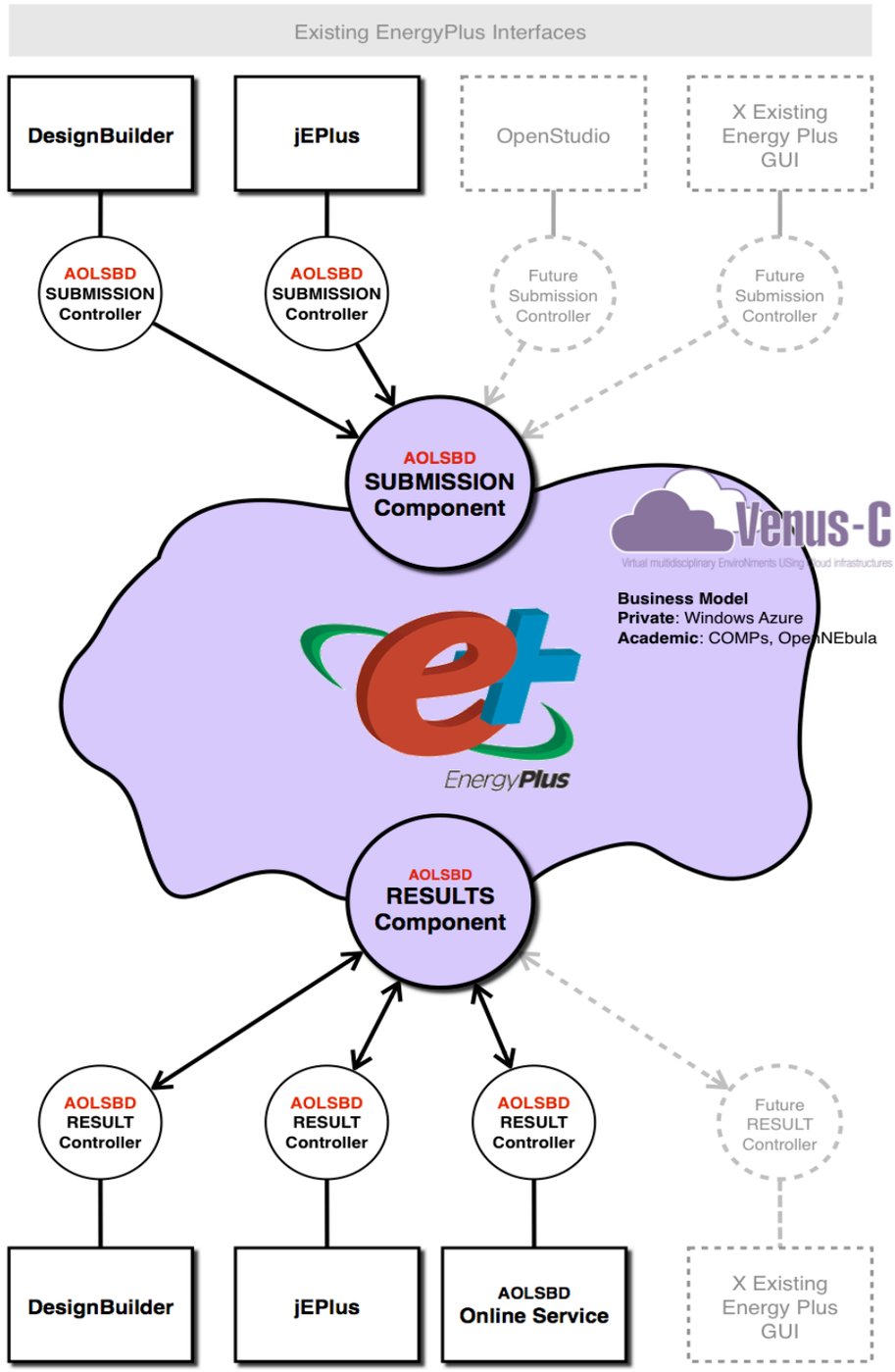
The Royal Danish Academy of Fine Arts Schools of Architecture, Design and Conservation School of Architecture

Barcelona Supercomputing Center

Microsoft Research

Venus-C



Next: Eco-efficiency analysis

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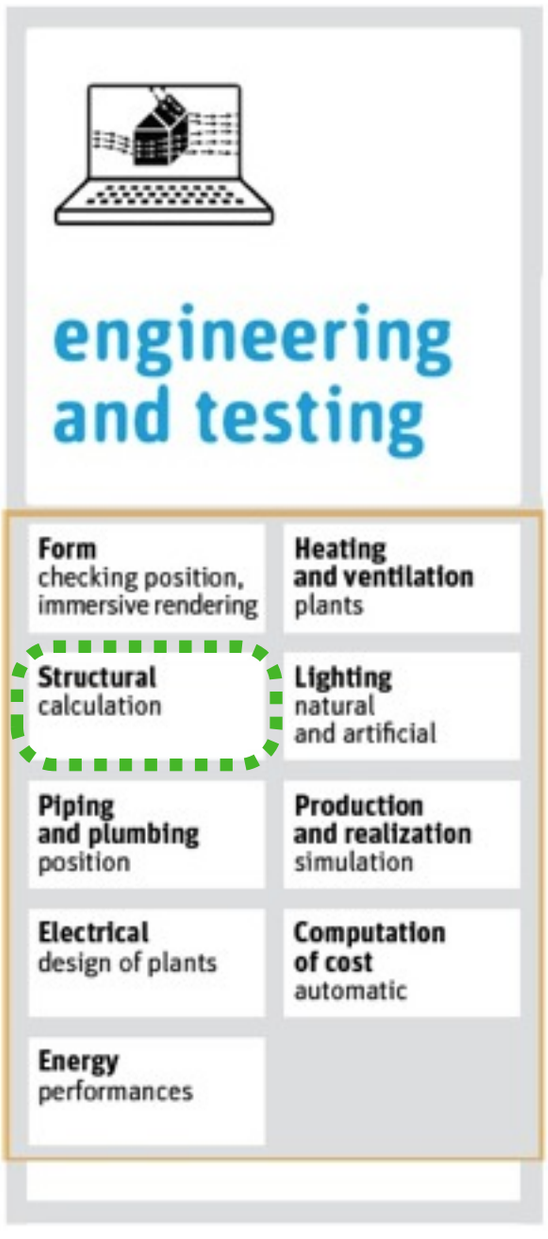
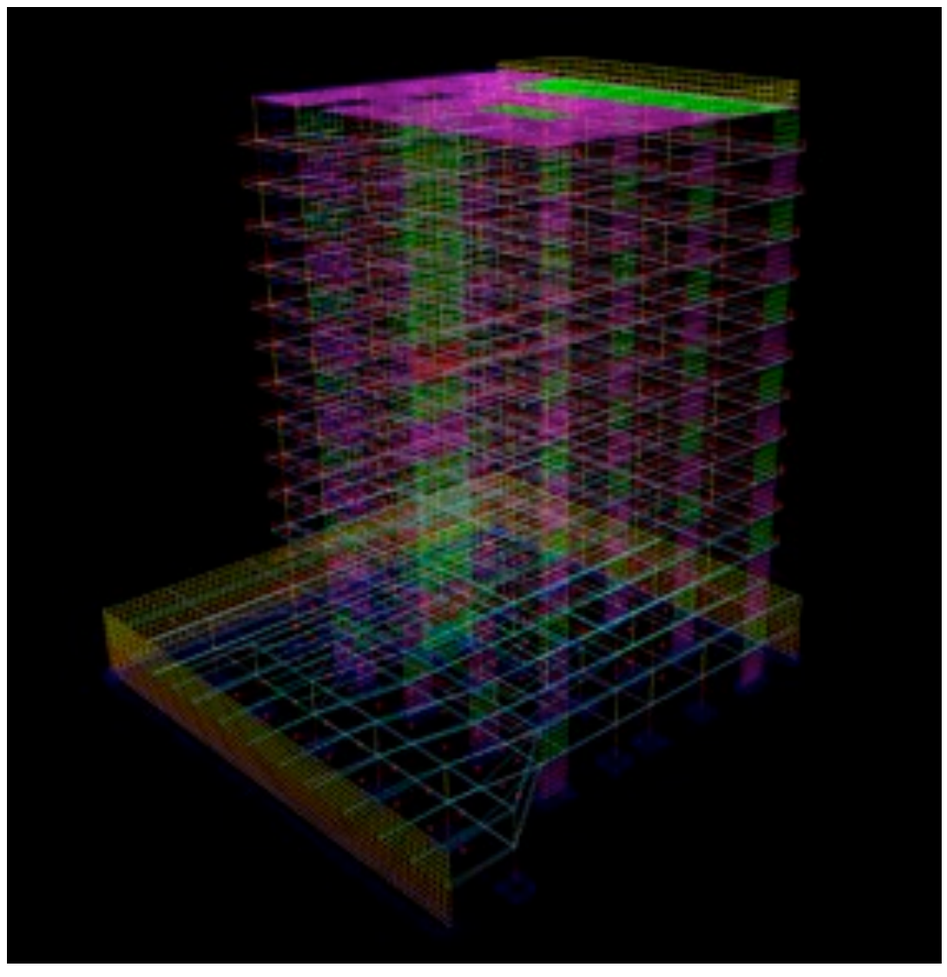
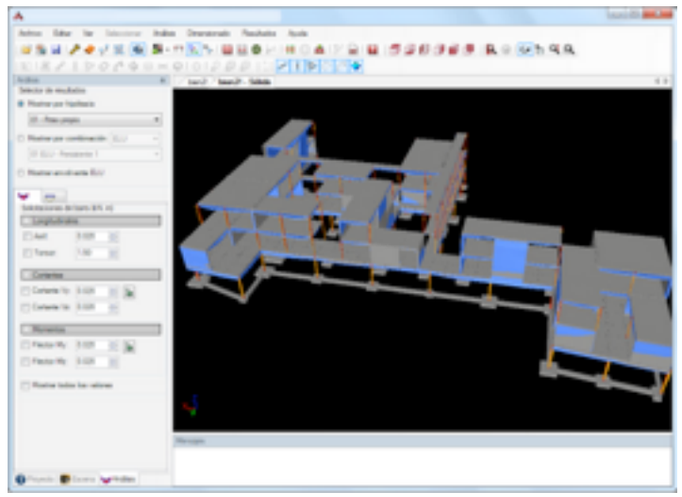


STRUCTURAL CALCULATION

Architrave by UPV on VENUS-C



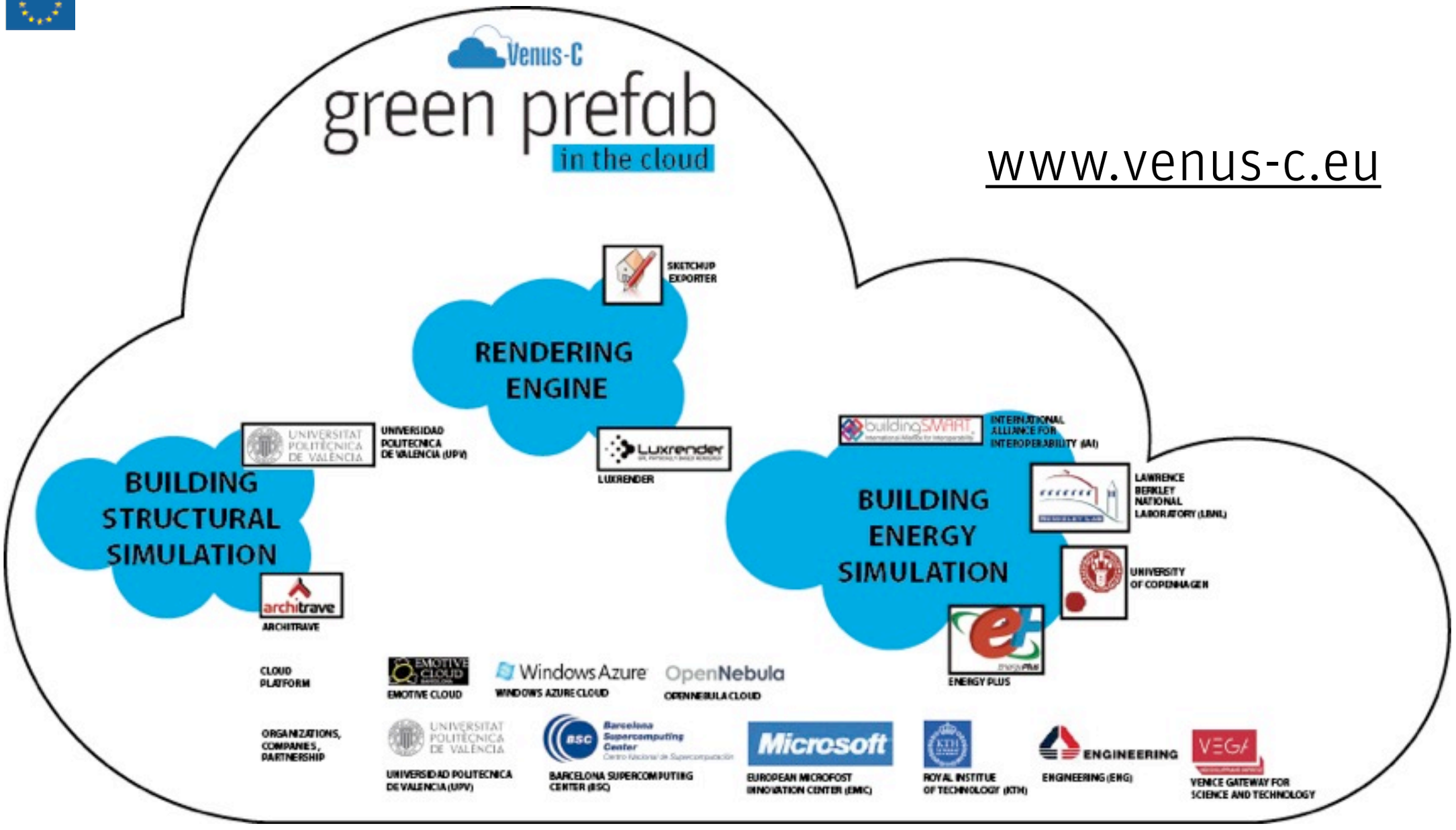


greenprefab architrave UNIVERSITAT POLITÈCNICA DE VALÈNCIA Microsoft Research Venus-C

VENUS-C: Green Prefab in the cloud

undergoing development, co-funded by the European Commission
Framework Programme 7 (2010-2012) - Research infrastructures projects

www.venus-c.eu



World announcement: 7 May 2012 CLOUD FUTURES 2012
End of VENUS-C project: 31 May 2012
Launch of commercial HUB-E: 1 June 2012

Background / The Management

Furio Barzon, Venice (Italy)

- founder and CEO of **Collaboratorio**
  (think tank for innovation in digital architecture)
- founder and director of www.architecture.it (20,000 architects)
- Curator and producer of international events in architecture, author of articles and books, lecturer at International Universities
- Master Degree in Architecture at IUAV, Faculty of Architecture of Venice (Italy) 110/110

Renzo Taffarello, Shanghai (**China**) and Palo Alto (**USA**) CFO and marketing strategy (10% of equity)

Background / Advisory Board

- **Prof. Vladimir Bazjanac**, U.S. Department of Energy (**USA**)
  Prof. of Building Technologies at Lawrence Berkeley National Laboratory, IFC standard founder

- **Prof. Qin Youguo**, Tsinghua University (**China**)
  former Dean and ICT expert

- **Ian Mc Nally**, ILT Solutions plc (**United Kingdom**)
  business accelerator, and ICT innovator

- **Paolo Privitera**, Pick1 (**USA**)
  Human Network Router

Background / Established Relationships

EUROPE Venus-C Consortium
founding partner (European project, 4.5 M €)

ITALY Progetto Manifattura
Green Prefab Italia srl (founded September 2011)

EUROPE MACE Consortium
founding partner (European project, 3.1 M €)

GLOBAL International Alliance for Interoperability
User Group member (IFC full compatibility)

ITALY architecture.it
owned media (more than 20,000 architects)

CHINA Taikong Panel
industrial partner (customised version)

Contacts

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